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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/855,382	05/15/2001	Takuya Yamamoto	47163-00037	8941

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JENKENS & GILCHRIST, P.C.
225 WEST WASHINGTON
SUITE 2600
CHICAGO, IL 60606

EXAMINER

AHMED, SHAMIM

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 07/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/855,382

Applicant(s)

YAMAMOTO ET AL.

Examiner

Shamim Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4 and 5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4 and 5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-4 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claim 4 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 4 is dependent upon a cancel-based claim 3. Should be dependent upon claim 1.

Remarks

In the following rejection, the claim 4 is treated as the claim dependent upon claim 1.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin et al (JP-10075069A) in view of Taneda et al (5,263,243) and further in view of Yates et al (6,372,113).

Shin et al disclose a process of making a multiplayer printed wiring board, wherein forming a via hole in an external copper foil of a copper clad laminate using a YAG laser; plating the copper clad laminate to form interlayer electrical connections (see the paragraph 14 to 18 of the translated version).

Shin et al also disclose that forming etching resist layer, exposing and developing the etching resist layer and thereafter a circuit pattern is formed through an etching treatment (see the paragraph 19 of the translated version and figures 1a-1g).

Shin et al fail to teach that the laser used to form the via hole is carbon dioxide.

However, in a method of forming via holes into copper clad laminates, Taneda et al teach that both YAG and carbon dioxide laser can be used to form via hole (col.7, lines 22-25).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Taneda et al's teaching into Shin et al's process because both the YAG and carbon dioxide laser are functionally equivalent as taught by Taneda et al.

Modified Shin et al remain silent about the external copper foil is waved with a surface thickness of 2.0 to 20.0 μm .

However, in a method of making copper clad laminates for fabrication of printed circuit board, Yates et al teach that the copper foil of the copper clad laminates is treated to make peaks and valleys or in other words, a waved copper foil is formed in order to enhance the bonding capability between the copper foil and the resin substrate (col.1, lines 7-13, col.6, lines 46-49 and col.7, lines 35-41).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Yates et al's teaching into modified Shin et al's process for increasing the bonding capability between the resin substrate and the copper foil as taught by Yates et al.

Yates et al teach that the waved copper foil has a surface roughness (Rz) of about 3-8 microns or μm (col.7, lines 38-42).

As to claim 4, Yates et al teach that the micro-profiles (Rz) matte side of the copper foil can be overplated with the aim of equalization of the micro-profiles (Rz) (col.10, lines 15-25).

Yates et al fail to teach that the surface roughness of the waved copper foil of 10-20 micrometer.

However, it would have been obvious to one skilled in the art to optimize the same in order to increase bonding capability by increasing the roughness and furthermore, it has been held that discovering an optimum value of a result effective

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variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shin et al (JP-10075069A) in view of Taneda et al (5,263,243) and Yates et al (6,372,113) as applied to claims 1 and 4 above, and further in view of Ando et al (5,382,333).

Modified Shin et al discussed above in the paragraph No.5 and Yates et al also teach that the copper clad laminate includes a bulk or base foil having a thickness of less than 18 μm and an electrodeposited bonding enhancing layer of fine copper particles (col.7, lines 38-49).

Modified Shin et al fail to disclose that the external copper foil of the copper clad comprises a rust-preventing layer.

However, in a method of making a copper clad laminate, Ando et al teach that a finally roughened copper foil is treated for rust prevention in order to prevent oxidation, thereby permitting easy storage (col.7, lines 16-33).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Ando et al's teaching into modified Shin et al's process for rust prevention of the copper foil by preventing oxidation of the foil and thereby permitting easy storage as taught by Ando et al.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shin et al (JP-10075069A) in view of Taneda et al (5,263,243) and Yates et al (6,372,113) as applied to claims 1 and 4 above, and further in view of Kataoka et al (EP-0996318).

Modified Shin et al discussed above in the paragraph No.5 but fail to teach that the external copper foil have a carrier foil used in pressing the copper clad laminate.

However, in a method of making a novel copper clad laminate, Kataka et al teach that a copper clad laminate is formed with a carrier foil, which is removed after pressing the laminate and thereby forming the copper clad laminate enabling laser perforating without forming burrs even at lower laser power (see the abstract).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Kataka et al's teaching into modified Shin et al's process for providing an improved copper clad laminate with an advantage of enabling laser perforating without forming burrs even at lower laser power as taught by kataoka et al.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 410335814 A and JP 411346059A disclose a process of using a carbon dioxide laser to form via on a copper foil during the manufacturing of printed circuit board.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

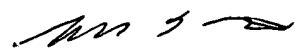
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Shamim Ahmed
Examiner
Art Unit 1765

SA
July 17, 2003


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700